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General Articles

OSTEODYSTROPHIA FIBROSA (OSTEOFIBROSIS) IN DOMESTICATED ANIMALS

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Although these terms may appear strange to many, there is no doubt that the condition is frequently encountered in domesticated animals in Britain. In the past the disease has been known in horses under the names "bran disease," "miller's disease," "big head," "bone disease," and in pigs as "snuffles," and in dogs as "rubber jaw." It has also been referred to as osteoporosis or osteomalacia although these terms represent conditions with an entirely different pathology. The confusion in terminology has been due to a large extent to the obscurity which has characterised our knowledge of this condition and our ignorance of its relationship to the other osteodystrophic diseases met with in animals, *viz.*, rickets and osteomalacia.

Thanks to the excellent work of the late Sir Arnold Theiler and his colleagues at Onderstepoort, and the able way in which he has summarised and collated his own work with that of other investigators in his lectures given under the auspices of the University of London [*Vet. J.* (1934.) **90.** 143-175 and 183-206] a considerable amount of progress has been made in arriving at a real understanding of the various osteodystrophic diseases of animals.

As the purpose of this paper is to give details of cases illustrating one of the chief types of osteodystrophy in animals, it is proposed, first of all, to outline in brief the present state of knowledge in relation to these conditions and for this purpose liberal use has been made of Theiler's publications.

The three chief dystrophic diseases of the skeleton in animals are rickets, osteomalacia and osteodystrophia fibrosa or osteofibrosis. Rickets, a dystrophy of the young, is a well-recognised pathological entity. Osteomalacia is, in short, adult rickets and, as in the case of rickets, is characterised by the presence of excessive amounts of osteoid tissue. The formation of osteoid tissue represents a stage in bone formation which is normally followed by lime-salt impregnation. In rickets and osteomalacia the deposition of calcium salts is defective and so bone-formation is arrested at the stage of osteoid tissue. In rickets, osteoid tissue is prominent at the epiphyses of long bones. In osteomalacia, it makes its appearance in the diaphyses of the bones. It is not evident at the epiphyseal junction, because at the age when osteomalacia occurs, growth of bone at the epiphyses has ceased and the junction has undergone ossification. As bone formation from the periosteum is more or less continuous throughout life osteoid tissue becomes prominent along the shaft under the periosteum. Osteoid tissue also makes its appearance in isolated areas within the bone.

Apart from defective bone formation and the consequent accumulation of osteoid tissue which occurs in osteomalacia, there occurs side by side with it atrophy of bone or osteoporosis.

With respect to the term "osteoporosis," it should be pointed out that it is used here to denote an exaggerated form of atrophy, a process which may occur in many diseases and is not peculiar to any one. Osteoporosis occurs whenever there is an excessive drain on the mineral reserves in the skeleton and is the result of lime salt resorption. This resorption, according to Theiler, takes place not by a process of decalcification during which a soft organic framework is left behind, but by a complete breakdown of bone in which a porous and lighter bone is formed. Resorption is not the reverse of calcification, and osteoid tissue, *i.e.*, bone devoid of calcium salts, does not appear in increased amounts in osteoporosis as it does in incomplete calcification. The occurrence of excess osteoid tissue indicates not decalcification but defective bone formation. Osteoporosis denotes pathological degrees of calcium salt resorption. Either of these two conditions, that is incomplete calcification and osteoporosis, may occur independently or both may be present together as in osteomalacia and osteodystrophia fibrosa.

Except for what has been said concerning the site of the changes, rickets and osteomalacia are pathologically identical and for this reason they are frequently spoken of together as osteodystrophia malacica. The changes which occur in these two conditions are also the same in all animals subject to them. Despite the identity of the lesions in different species they are, however, not aetiologically identical. Although it is known that calcium, phosphorus and vitamin D are three factors essential for normal growth, it is found in practice that they do not play the same part in all animals. It has been shown by Theiler that in cattle and

sheep, rickets and osteomalacia, in the presence of vitamin D which is not usually absent, is an "aphosphorosis." He states that bovine calcium requirements are comparatively low and are much lower than their phosphorus requirements and that cattle when at pasture, will miss the phosphorus long before they miss the calcium. Pig foods, on the other hand, are rich in phosphorus and poor in calcium and consequently rickets in pigs is usually a result of calcium deficiency, an acalcicosis. In sty-fed pigs, avitaminosis may also be a factor. In dogs, deficiency of vitamin D is an important factor.

Generally speaking, rickets is fairly common in this country but not so true osteomalacia. Although quite a number of cases of osteomalacia have been recorded in horses and goats there now appears to be ample justification for concluding that they were osteodystrophia fibrosa. Theiler states that true osteomalacia has yet to be recorded in the horse. Similarly in dogs and pigs, the conditions referred to by this name are usually osteodystrophia fibrosa and not osteomalacia.

The third osteodystrophic disease in animals is one which has only come to be recognised within recent years. It is osteodystrophia fibrosa, also known as osteofibrosis. Although by no means uncommon in animals, it has, as previously mentioned, most often been described as osteomalacia or osteoporosis, conditions which we now know to have a different pathology.

Osteofibrosis occurs in horses, pigs, goats and dogs, usually in a sporadic form. Owing to the epizootic nature which the disease in horses has sometimes assumed in large stables, it has been attributed to an infective agent, but in the light of our present knowledge such outbreaks were doubtless the result of a common cause, namely, mineral imbalance.

It is a disease which develops insidiously and runs a chronic course. In the horse, months or years may elapse before the condition is detected and less pronounced forms may never be diagnosed. Usually the first symptom is stiffness, lameness or marked stumbling. This becomes progressively more marked and soon the animal loses condition. There is no evidence of fever and the appetite remains normal. Bones may fracture under very slight exertion, *e.g.*, the lower jaw in dogs (*see* Case 5), and the long bones or sesamoids in thoroughbreds. The ribs are particularly prone to fracture (*see* Case 1). Ligaments sometimes become detached. Usually these early symptoms are overlooked or attributed to other causes. The most distinctive sign of this disease is the symmetrical swelling of the lower jaw, particularly over the alveolar margin. Later the whole of the jaw becomes involved and the mandibular space considerably reduced. Similar changes become evident in the maxillae and eventually the lachrymal, zygomatic, and maybe nasal, frontal and palatine bones are considerably swollen and softened. The nasal cavity is reduced and breathing hampered, hence the condition is sometimes known as "snuffles" in pigs. The constriction of the mouth due to the swollen and softened bones renders eating difficult and the tongue tends to protude beyond the incisors. Eventually the head assumes a distorted and monstrous appearance.

Post-mortem examinations reveal the swelling and softening of the affected skull bones to be due to the replacement of the normal bone by tumour-like masses of tissue which may be sufficiently soft to be cut with a knife. The extent to which these changes occur can be seen in the accompanying illustrations. The skeletal bones are very porous, indicating the presence of osteoporosis which is one of the first changes evident in the development of this condition. The fragility of the bones and their liability to fracture in the early stages is due to this change. Many of the bones, *e.g.*, ribs, scapulae and pelvic bones may also be softened, swollen and mis-shapen. Some may reveal fractures encased in an imperfectly formed callus. The articular surfaces of the joints are sometimes ulcerated and the marrow of long bones is frequently replaced by reddish-gelatinous tissue.

The above changes are the result of progressive calcium resorption which leads to osteoporosis and, if the disease process continues unchecked, to complete breakdown of bone and its replacement by a tissue of a fibro-cellular structure. There is often an unsuccessful attempt at bone formation in the substance of this new tissue as revealed by the presence in it of scattered islands of osteoid tissue. This newly-formed tissue is, however, unable to withstand the stresses and strains to which some bones are subjected and consequently the tendency is for an excess of the new tissue to be formed in such situations. Hence the tumour-like appearance of the changes in such bones as the jaw bones.

Within recent years a great deal of experimentation has been carried out with regard to the causation of this condition in equines and it has now been more or less established that it arises as a result of mineral imbalance. The precise cause is too high a proportion of phosphorus to calcium in the food. Either a low calcium content combined with a high phosphorus content or a normal amount of calcium with excessive quantities of phosphorus will give rise to the condition in susceptible animals. It is known that a ratio of calcium to phosphorus which exceeds 1 : 2 will give rise to osteofibrosis in horses. Feeding on barley, which has a ratio of 1 : 14, alone, will produce the disease in less than twelve months. Too great a proportion of phosphorus-

rich cereals and bran to hay rich in calcium will give rise to the condition. It can thus be seen why the disease was so common among millers' horses and those fed heavily on bran.

Just as osteomalacia, which in cattle is an aphosphorosis, has not been recorded in horses, so osteofibrosis due to excess phosphorus has not been recorded in cattle. A similar example showing the varied requirements of different species is to be found in Cases 4 and 5 to follow, when osteodystrophia fibrosa developed in two goats kept under precisely the same conditions as cattle which showed no apparent change.

Regarding the causation of this disease in pigs and dogs, there is as yet insufficient evidence to warrant a statement that too wide a ratio is also responsible for the condition in these species. Other factors may be involved.

Having summarised the chief dystrophic conditions of the skeleton in animals, it is now proposed to describe six cases of osteodystrophia fibrosa which have come within the experience of the writer.

Six Cases Described

No. 1: Osteofibrosis in a Horse.

A thoroughbred filly, 18 months old, had been ailing for six months. The filly had been out at grass practically every day since it was a foal. When about ten months old, she was chased by a dog and in jumping a wire fence cut her near hind leg rather badly. The injury did not respond to treatment and a month later the veterinary surgeon was called in. The wound was not healthy but eventually healed. Four months later the filly was found to be extremely lame on the off fore leg. When seen by the surgeon she had her head down and the stud groom said that when being led she resented the halter being pulled, but there was no apparent reason for this. Next day the leg was swollen at the shoulder joint and also at the site of the original lesion on the hind leg. Septicaemia was suspected and injections of staphylococcus and streptococcus sera were given. Marked improvement followed, the swellings subsided and the animal put on weight. She was turned out to grass in the daytime and given hay and bran mashes when brought up at night.

Six weeks later the veterinary surgeon was again in attendance as the filly was again lame behind and was generally worse. Strongyles were found in the faeces and appropriate treatment given. At this time a slight swelling of the face was noticed and the animal rapidly lost condition. A tuberculin test was negative. The facial swelling became gradually worse and interfered with respiration. During this period she fed well, hay and bran mashes being supplemented by fresh cut clover and rye grass.

The writer visited the animal at this stage. There was marked swelling of the head, particularly over the zygomatic ridge, and the whole skull appeared somewhat distorted. The filly moved with difficulty, stumbling being marked. The temperature was normal, the eyes were bright, and there were no glandular swellings. Breathing was difficult, roaring prominent. The pleuritic groove was very marked.

Osteodystrophia fibrosa was diagnosed and the filly immediately slaughtered for *post-mortem* examination.

Post-mortem Examination.

The organs and soft tissues of the body were apparently normal with the exception of an aneurism of the mesenteric artery associated with strongylosis. Most of the bones revealed porotic changes and four ribs on the right side of the chest had been fractured. There was no history of any accident nor were there any symptoms which could be associated with the lesions. Particular attention was paid to the joints, but in no case was there any evidence of abnormality on the cartilaginous surface of the joints.

The most conspicuous changes were associated with the head. The nature and extent of these lesions will be best appreciated by referring to the illustrations. Fig. 1 shows a cross-section through the nasal region of the skull between the third and fourth molar teeth. The enormous

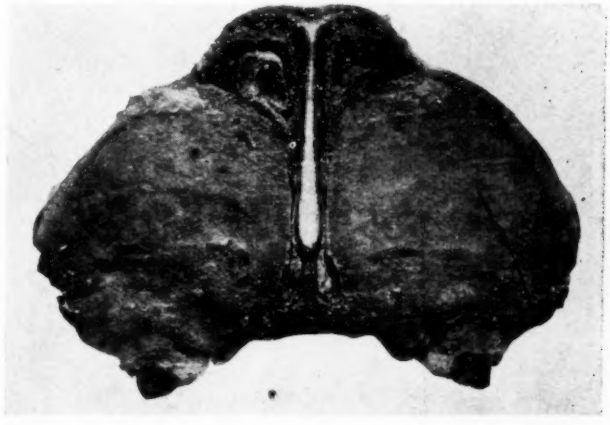

Fig. 1.—Cross-section through Skull of Horse (18 months).

tumour-like swelling of the maxilla has occluded the maxillary sinus and compressed the ventral turbinate bone against the nasal septum. The substance of the abnormal tissue and the overlying shell of bone was soft enough to be cut with a knife. The track of a knife-incision can be seen to right of the photograph. The nasal bones were unaffected and had to be sawn. The palatine bones were also affected (*see* Fig. 2). The swelling of the maxillary and palatine bones had so reduced the mouth cavity that the tongue was mis-shapen in consequence.

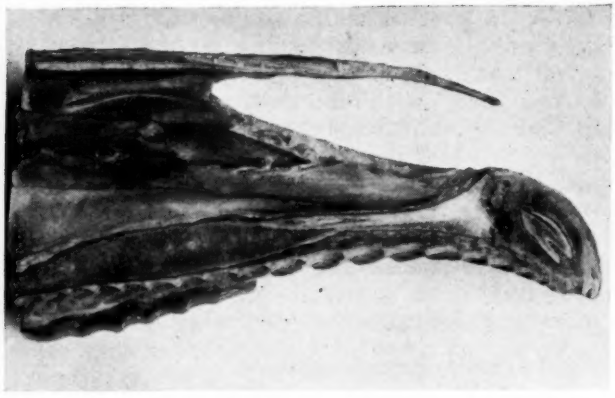

Fig. 2.—Longitudinal section through Skull of Horse (18 months) to show thickening of Palatine Bone.

No. 2: Osteofibrosis in a Pig.

The pig, the subject of this case, was found straying at large, was seized by the police and taken to a veterinary surgeon for destruction. As the owner was not discovered, there is no history available.

The animal appeared to be about six weeks old from its general development, but from a general examination was obviously nearer six months of age. Owing to the extremely distorted appearance of the head this was sent to the writer for examination. Osteodystrophia fibrosa was immediately diagnosed and efforts to recover the remainder of the carcase proved successful.

As in Case No. 1, the most conspicuous changes were associated with the skull.

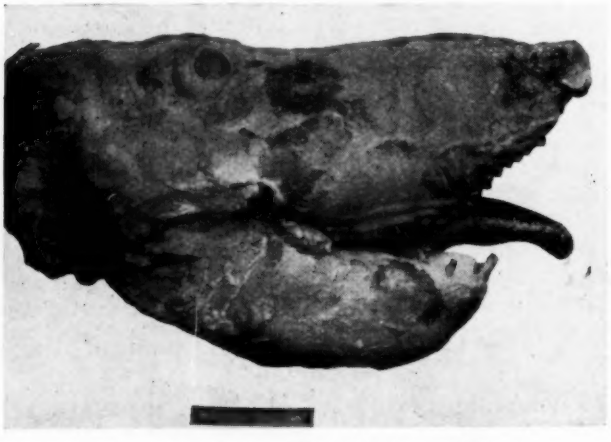

Fig. 3.—Osteo-fibrosis in a Pig.

Fig. 3 gives the lateral appearance of the skull, the main features of which are the extremely swollen appearance of the upper jaw, the overhanging of the lower jaw by the upper jaw, the convexity of the palate and maxillae, and the protrusion of the tongue. The enormously reduced mouth cavity is also apparent. The substance of the upper jaw was sufficiently soft to allow cutting with a knife and the mark of the knife incision in Fig. 3 shows the position of the transverse section taken for Fig. 4. This latter illustration calls for little description as the complete removal and replacement of the bony structures by the tumour-like mass of new tissue is very striking.

Fig. 4.—Cross-section through the Skull of Pig showing the Tumour-like Mass of Tissue impinging on the Nasal Cavity.

Many of the skeletal bones were soft and mis-shapen, particularly the humerus, the articular surface of which had been displaced posteriorly. In many of the bones the articular cartilages were " ulcerated " and the medullary cavities were filled with a reddish gelatinous substance.

Nos. 3 & 4: Osteofibrosis in Goats.

The heads of two goats were received at different dates from isolated cases in Liverpool. There was no relationship between the two cases, although the available history in both was the same. They had been kept in two city shippons in close proximity to cattle and fed on the same food. The characteristic swollen appearance of the jaws had led the veterinary surgeons concerned to suspect actinomycosis.

In both cases the *post-mortem* examinations were performed by the practitioners and whilst

no abnormalities or lesions were discovered, it was admitted in both instances that no detailed examination of the skeletal structures was made.

The writer's investigations were confined to the skulls, where the changes were centred in the maxillae and mandibles. These bones were swollen and softened and could be cut with a knife. Although the changes were not as prominent as in Cases 1 and 2 the changes were sufficiently marked to interfere with breathing and eating.

Efforts to macerate the skulls in order to study the extent of the changes and the unaffected bones resulted in the digestion of almost the whole of the tissue, only fragments of bone being left.

Nos. 5 & 6: Osteofibrosis in Dogs.

The first case was received from a Lancashire veterinary surgeon as an interesting case of "osteomalacia" or "rubber-jaw," a condition which he found to be fairly common in the dog. This particular dog had been treated about two years previously for a fractured jaw and in the course of his letter the practitioner stated that it was his experience that "osteomalacia" frequently followed such fractures. It is interesting to note the suggestion in view of the fact that in osteodystrophia fibrosa it has been the writer's experience and the same point has been noted by Theiler (1934), that fractures are frequently the first indication of the existence of osteodystrophia. In sending this specimen the veterinary surgeon also noted that treatment of such conditions with calcium, cod-liver oil, etc., had never proved satisfactory.

In this case the changes represented a much earlier stage than those previously referred to. Except for slight softening there was little obvious change in the upper jaw. The lower jaw, however, was considerably swollen and answered to the description of "rubber-jaw." Although the bone had not been completely removed it consisted of little more than a thin shell and was easily cut with a knife.

Fig. 5.—Osteofibrosis in the Skull of Retriever (nine years).

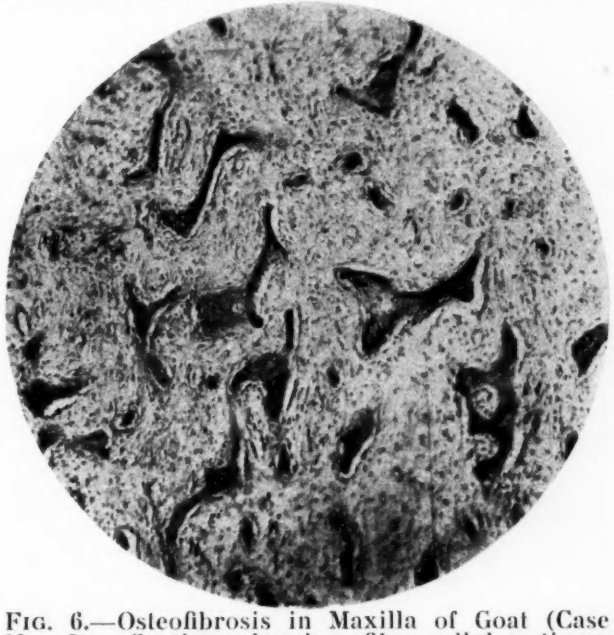

Fig. 6.—Osteofibrosis in Maxilla of Goat (Case No. 3). Section showing fibro-cellular tissue and trabeculae of osteoid tissue. ×60.

Fig. 7.—Osteofibrosis in Maxilla of Goat (Case No. 4). Fibro-cellular tissue and trabeculae. ×60.

Fig. 8.—Osteofibrosis in Maxilla of Dog. (Case No. 5). Note replacement of bone by fibro-cellular tissue. ×50.

The second case was in a nine-year-old retriever and diagnosed by the veterinary surgeon as "rubber-jaw." Unfortunately there was no history available. The dog was destroyed and the head showed the typical changes of osteofibrosis. The lower jaw was swollen and softened. The bones of the upper jaw were also soft and the nasal portion considerably distorted by the excessive production of fibro-cellular tissue which had practically occluded the nasal cavities. Fig. No. 5 shows the extent of the changes revealed by a transverse section across the nose between the first and second molar teeth.

The pathological histology of all the above cases is the same, subject to slight variations according to the stage of the disease process. Photomicrographs Nos. 6-8 serve to illustrate some of the histological changes which occur in this condition. A glance at the sections shows that the histology of the affected bone has undergone a complete change. The osseous tissue has been replaced by tissue of a fibro-cellular nature and in the substance of this tissue trabeculae of osteoid tissue are to be seen. The irregular distribution of these trabeculae conveys a very characteristic appearance.

These changes are not usually uniform throughout the affected tissue. Some portions show fibro-cellular tissue in which trabeculae are absent and the appearance is suggestive of a fibroma. Other areas are characterised by the presence of numerous osteoclasts. The various changes to be seen are evidence of the removal of bone and its replacement by fibro-cellular tissue in which efforts are made to form new bone.

(*Concluded at foot of next column.*)

A METHOD FOR THE PREPARATION OF MANGE MITES FOR MICROSCOPICAL EXAMINATION

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Some time ago the writer of these notes was approached and asked to supply prepared microscope slides and photomicrographs of mange mites. Skin scrapings containing *Sarcoptes canis* and ear exudates from a cat containing Otodectes were sent to us and the following method we employed in isolating the mites, without damaging them, may be of interest to the veterinary profession.

In both cases the infected materials were treated in a similar manner.

(1) Scrapings are digested in a solution of potassium hydroxide (5 per cent.), placed in a small petri dish and heated in a hot air oven at 80° C. till completely disintegrated.

(2) A small quantity of the resulting mass is examined microscopically to confirm the presence of the mites.

(3) The whole contents of the petri dish are transferred to a 100 c.c. separating funnel and allowed to stand until two distinct layers are formed, of chemical and disintegrated scabs, etc.

(4) The stop-cock of the funnel is opened slowly and a small quantity of the material is run on to a 3 in. × 2 in. glass slide, which is examined under the lens of a dissecting microscope. The mites, larvae and eggs appear as small white dots in the débris and we use an

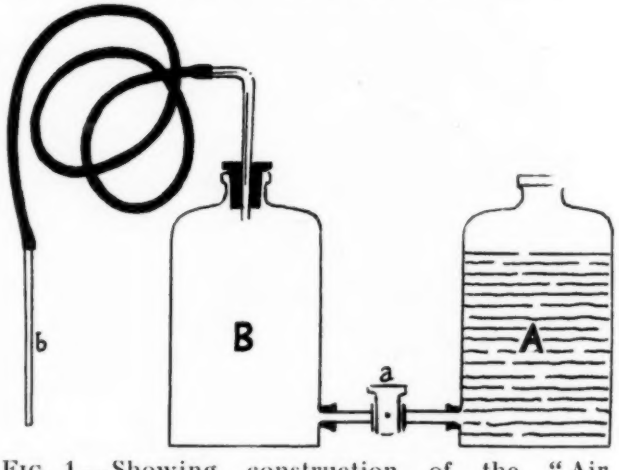

Fig. 1.—Showing construction of the "Air Needle" Apparatus.

The writer wishes to thank Messrs. A. J. Caldwell (then at Burnley); F. Hopkin, Manchester; J. Holroyd, Blackburn; J. H. White and R. S. White, Liverpool, who very kindly provided the material referred to in this paper.

"air needle" to blow foreign matter away from the main objects.

The "air needle" referred to is an easily constructed apparatus and we find it useful for many minute insect dissections. Two 1 litre aspirator bottles are connected as shown in Figure 1. Jar A is filled with water and Jar B, of course, is left empty so long as the stop-cock A is turned off; B has a cork bored to take a glass tube at its neck—this is joined by means of thin rubber tubing to a needle of hard glass tubing, B: it will be seen that when the tap A is turned on air will be forced out of B through the needle (by the rising water in B). By carefully adjusting the flow of air through the needle, débris and foreign matter are easily removed from objects being dissected.

(5) Isolated mites are removed from the dissecting microscope on a stiff bristle and transferred to a petri dish or watch glass containing clean water.

(6) After time has been allowed for washing away traces of KOH by changing the water in (5) several times, the objects are dehydrated in alcohol (we use with success n-butyl alcohol) of varying strengths, starting, of course, with a weak solution till the pure alcohol is reached.

(7) Following alcohol, the mites are cleared in xylene and are then mounted in balsam on the usual 3 in. × 1 in. microscope slips.

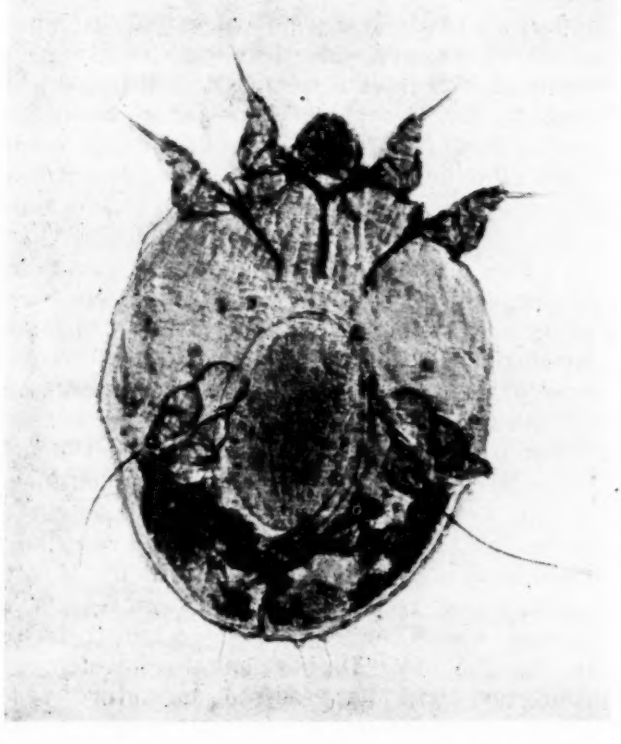

Fig. 2.—*Sarcoptes canis* photographed immediately after treatment in potassium hydroxide and separated from surrounding débris. Female mite × 120.

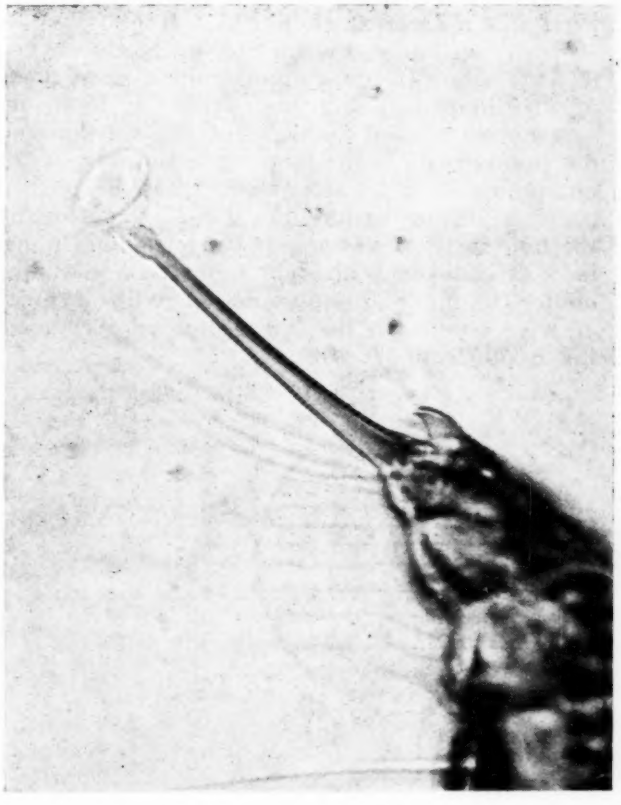

Fig. 3.—Terminal segment of leg of *Sarcoptes canis* showing sucker-like appendage.

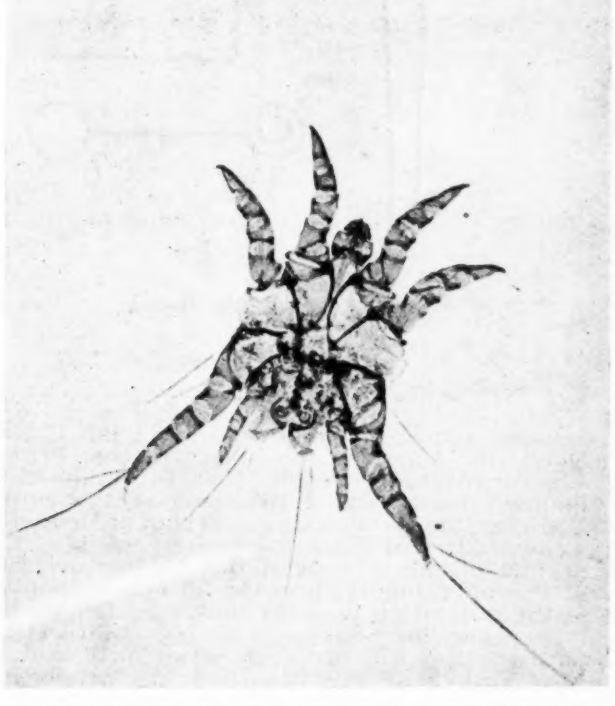

Fig. 4.—Otodectes from ear of cat, male mite ×70.

The separating funnel used in these experiments is an ordinary 100 c.c. funnel of the type common to most laboratories. The shape we

prefer is illustrated in Fig. 5. It has a short stem drawn out at the end to a slightly curved jet; the whole is dependent from a stout piece of wire looped at each end; loop "a" is firmly screwed to a shelf in front of the worker and the funnel rests in the loop "b"; the wire when not in use as a funnel "stand" can be pushed back on to or under the shelf. Occasionally the hole in the stop-cock or the jet of the funnel may get choked with débris but it is a simple matter to move the obstruction with a piece of wire similar to the wire supplied for cleaning hypodermic needles.

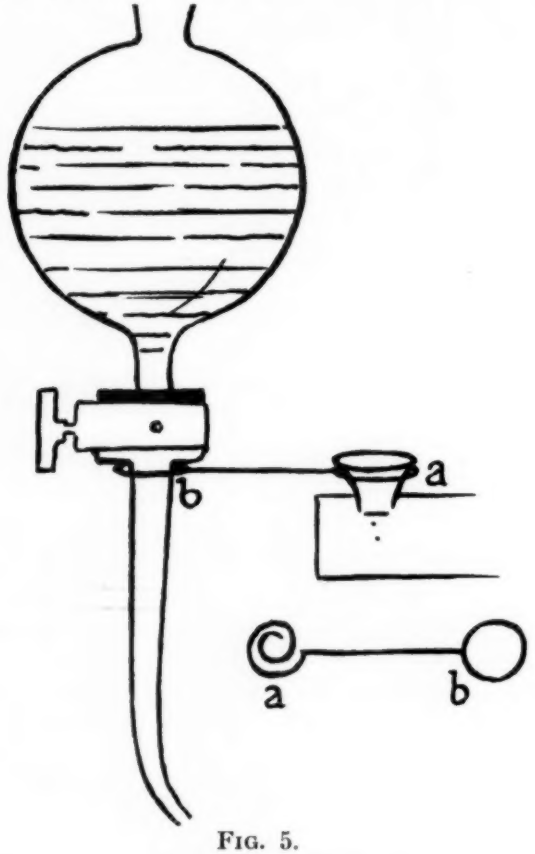

Fig. 5.

TUBERCULOSIS IN AMERICA

In an article on public health in the United States of America published in the *British Medical Journal* of October 10th, Dr. Ralph M. F. Picken, Mansel Talbot Professor of Preventive Medicine, the Welsh National School of Medicine, writes: "It is difficult to say how much of the decline of tuberculosis is due to improvement of the milk supply, because little is known as to the proportion of cases caused by the bovine type of bacillus. So much has been heard about pasteurisation (75 per cent. of all milk sold in New York State is pasteurised, the proportion varying from 95 per cent. in the 60 cities to 27 per cent. in the rural areas) that the efforts to eradicate tubercle in cattle are apt to be overlooked. Practically every cow in New York State has been submitted to the tuberculin test and the reactors have been slaughtered. Only 1 per cent. reacted in 1935 as compared with 50 per cent. in 1919, when the work began."

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VETERINARY REPRESENTATION AT THE COLONIAL OFFICE

In our previous editorial we cited an instance of weakness in official policy at the Colonial Office, a weakness due, we believe, to the absence of a permanent adviser in veterinary matters in this Government department. The refusal of the Secretary of State for the Colonies to appoint a successor to the late Mr. R. E. Montgomery has caused for some time disappointment and bewilderment throughout the profession both at home and abroad and the "National" has on several occasions urged the Secretary to make such an appointment in the interests both of the dependencies and the Colonial Office itself.

Mr. Secretary Ormsby Gore has now informed the Association that "the requirements of the public services in the Colonial Empire do not necessitate the revival of this appointment." In justification of this decision we learn to our satisfaction that during recent years there has been a marked increase in collaboration between veterinary officers in the more important Colonial dependencies. This collaboration, we believe, has developed partly as a result of a tour of some of these dependencies made by Mr. Montgomery just before his death, and in itself this increasing collaboration seems to us a further justification for the appointment of a permanent official with veterinary experience and sympathy at the Colonial Office in order that the collaboration may be encouraged to the full. It is perhaps even more surprising that the decision not to appoint a veterinary adviser has followed so closely upon the appointment of an assistant adviser in agriculture.

But although the Secretary to the Colonial Office has decided not to renew the appointment of the Veterinary Adviser we are pleased to learn that all reports of Colonial Veterinary Departments and matters which involve questions of research or policy in respect of animal health or on which technical advice is sought by the Colonial Governments concerned will be referred in future to a standing committee of Animal Health. This committee, which includes five veterinarians, Sir John Orr, Sir John Stanton (the medical adviser) and Mr. Stockdale (the agricultural

adviser), should go some way to improve the position of veterinary advice at the Colonial Office, provided that this committee becomes effective and is frequently consulted instead of meeting but rarely. We contend that veterinary matters are of sufficient importance in the colonies to need continuous advice at headquarters and we believe that a permanent adviser and a committee such as that now appointed are complementary rather than mutually exclusive. This was found to be so during Mr. Montgomery's appointment, when both the veterinary adviser and an advisory committee were existent. We hope that the experience gained with the committee will in due course lead to the re-appointment of a permanent adviser as well, when the Colonial Veterinary Service may indeed act as a unit with an effective head at the Colonial Office.

Clinical Communication

RAGWORT POISONING IN PEMBROKESHIRE

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I first recognised this condition some twelve years ago when Professor Craig of the Veterinary College, Dublin, now holder of the William Prescott Chair in Animal Pathology at the University of Liverpool, wrote to the *Veterinary Record* describing the poisoning of cattle and horses in Ireland by the weed; before this I was at a loss to account for the cause in cases exhibiting similar symptoms to those described by him.

In cattle the first symptom exhibited by the affected animal is a tendency to wander about a little apart from the others; then diarrhoea is noticed with straining and staggering gait. Brain symptoms follow: the beast will go through hedges and gaps, driving its head into things. About the fourth day the animal goes down; the straining still continues and the posterior part of the bowel is prolapsed, sometimes to the extent of six to eight inches. Death ensues in a day or so.

In the horse the symptoms are much the same. Frequently, but not always, there is diarrhoea and the horse wanders about aimlessly. After about two days the brain symptoms become marked and there is the same tendency to push through and over any hedge or bank. One horse went through into a quarry, another walked up a half-roof and smashed through into a stable. I believe that many of these cases, especially those not exhibiting diarrhoea, are diagnosed here as grass disease and I have often thought that there might be some connection.

On *post-mortem* in cattle I have always found oedema of the mucous membrane of the abomasum. The liver is more or less pale and cirrhotic and the gall bladder contains far more bile than normally.

In the horse I have found the small intestine blood red on the peritoneal surface.

I am convinced that cattle and horses do not eat the weed when it is growing flourishingly, unless it may be during a dry spring when the small leaves of the weed come up before the grass, because the weed has a deep spreading root; then the animals may accidentally eat these small leaves. The real danger is, I believe, from feeding hay containing ragwort; also, when the weed is mown down and allowed to lie on the pasture the animals may eat it when dry. On the last farm on which I met with this form of poisoning I examined the rick of hay and on its cut surface I could see that the stems of the ragwort were as numerous as the stars in the sky on a starry night: a fanciful simile, maybe, but I know of none more accurate.

In my experience, no treatment is of any use. I have advised that the animals on the farm where poisoning occurred should be given lime water because I have read that it takes longer to poison an animal with ragwort when plenty of lime is supplied in the food. I must mention here that I have never seen the poisoning on a farm where the land has been well limed or basic slag used, nor have I seen an animal attacked when it has been given a little milk in the diet.

There is no doubt that ragwort is a cumulative poison and there must be a latent period up to nearly five months, because when the pasture is almost clear of the weed one still gets death from the poisoning.

The question of eradication of ragwort is now being raised. Some have advised the purchase of a supply of Cinnabar moths, but this is not necessary as we have an abundance of this moth here in Pembrokeshire, but I have yet to see a caterpillar on a growing flourishing plant; directly the plant is cut and placed in the sun, however, I find that the caterpillar will consume the leaves in about ten days to a fortnight.

The only way to eradicate the plant, in my view, is to cut it twice during the season (never allowing it to flower and seed) and gather it up and place it out of reach of cattle and horses.

Sheep in this county eat a great deal of the weed. They seem to make for it, apparently with no ill effects, and where sheep are kept regularly there is very little ragwort.

Abstracts

[Transmission Experiments with Bovine Malignant Catarrh. Daubney, R., and Hudson, J. R. (1936.) *J. Comp. Path. & Therap.* **49.** 63.]

The investigations described in this article go a long way towards clarifying the confusion which has surrounded the disease known as bovine malignant catarrh. This disease, which occurs fairly commonly in Europe, has been studied extensively. Nevertheless, opinions still differ with regard to its aetiology and transmissibility. Of recent years reliable workers, including Goetze and Liess and Rinjard, have succeeded in transmitting infection by means of large inoculations of blood from affected animals. Meanwhile in South Africa a similar, but apparently more virulent type of disease, snotsiekte, has long been known and was described in detail by Mettam in 1923. This disease differed from malignant catarrh in that it appeared as a much more specific clinical entity, showing a characteristic train of symptoms and was regularly accompanied by lesions of a lymphatic aleucaemia and leucostasis. Furthermore, at a time when but little was known about the nature of malignant catarrh, snotsiekte had already been transmitted from animal to animal by blood transfusions. It will also be remembered that the hypothesis was advanced, backed by circumstantial and a little experimental evidence, that snotsiekte was contracted by cattle from the blue wildebeeste (blue gnu), lice being the intermediate vectors.

Daubney and Hudson, working in Kenya, have made a careful study of strains of infection which they classify as malignant catarrh because they have been obtained from sources removed from direct contact with wildebeeste. The details of their investigation are unsuitable for abstraction but their findings may be summarised as follows. The infection exists in Kenya in mild and serious forms. The mild form closely resembles the European type of infection and is irregularly transmissible by blood inoculations. The serious form closely resembles the "head and eye" type of malignant catarrh described in Germany and snotsiekte of South Africa. The serious form is much more readily transmissible. The "head and eye" type of infection has been studied extensively as regards its infectivity for cattle and their findings in this respect are detailed. In addition, the writers report the infection of rabbits by subdural and intraperitoneal inoculations of blood. In the early rabbit passages lesions of aleucaemia are seen but later the virus becomes neurotropic. It has also proved possible to infect cattle by inoculation from rabbits.

The foregoing work should clear away any lingering doubts regarding the transmissibility of malignant catarrh. In addition, it seems to indicate that only one specific disease exists which, owing to variations of virulence of strains of virus, may appear as a barely visible, barely transmissible catarrh of mucous membranes, or as the highly virulent and characteristic condition known as snotsiekte. The final answer to this question of identity, however, depends upon immunological evidence, and experiments upon this aspect of the subject have not yet been reported.

E. J. P.

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[On the Scientific and Practical Value of Ionisation in Ophthalmology. Erlanger, G. (1936.) *Vet. J.* **92.** 8. pp. 280-290.]

Ionisation, the introduction of drugs and electrolytes to living tissues, can be used successfully in the treatment of eye disorders. New and simple technique, capable of administration by any practitioner, is described. Ionisable drugs can by this means be introduced directly to the site of the trouble. The effect can often be augmented by first injecting substances such as thyroxin. Ionisation changes the whole circulation as is shown by variations in the intra-ocular pressure and by the rate at which fluorescein, injected into the ear, fills the anterior chamber of the eye after ionisation at the cornea. Spectacular discoveries have occurred during the course of fifteen years' experience of the application of ionisation methods to eye diseases of dogs. Various disorders of the human eye have also been treated with success. A complete restoration of function is obtained in early stages of common eye diseases, such as conjunctivitis, scleritis and iritis, and impressive results can often be secured with more obscure cases. There is hope, as a result of experiments on guinea-pigs, that the day is not far distant when medical treatment of cataract will be possible.

W. L. S.

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[Fleece Characteristics of Stud Merino Sheep, in relation to the Degree of Wrinkliness of the Skin of the Breech. Belschner, H. G., and Carter, H. B. I.—*Aust. Vet. J.* **12.** 2. pp. 43-54; II.—*Aust. Vet. J.* **12.** 3. pp. 80-89.]

The authors state that blow-fly strike in sheep does not occur by chance, but that it is essentially due to the inherent attractiveness of a susceptible animal. The most important single factor determining susceptibility to fly strike in merino sheep has already been shown to be the degree of skin development, or "wrinkliness," of the breech. For practical purposes three types of breech are recognised—an A type which is the plainest, a C type which is the wrinkliest, and an intermediate

B type. The plainest type of breech would appear to be least liable to fly strike, but opinions differ as to how far "plainness" should be encouraged by breeders, since it is commonly believed that certain desirable attributes, in particular the density and compactness of the fleece, are closely associated with the development of skin folds. The authors were uncertain as to how far this belief was founded on fact, and the above studies were undertaken to examine and compare important features of the merino fleece, such as total fleece weight, scoured weight, spinning count and staple length. Observations were carried out on stud merino ewes at sheep stations 300 miles apart for two years in succession, and the main conclusions may be summed up as follows:—

I.—That sheep classed as relatively unsusceptible to fly attack (Type A) may furnish a slightly higher proportion of top line wool than the relatively susceptible Type C.

II.—That despite opinions to the contrary, the wool from Type A sheep may be as fine as that from Type C sheep.

III.—That strong wool is not necessarily a characteristic of sheep of low susceptibility (Type A) but may be carried by many sheep which are relatively susceptible (Type C).

IV.—That usually there is little difference in the condition carried in the fleece by the two types, but that sheep of Type C tend to carry more than the relatively unsusceptible Type A.

Although fleece densities were not actually compared in the A and C groups, the authors suggest that the C type possess slightly denser fleeces, but that this is probably balanced by the A type sheep possessing wool which is longer in staple.

W. L. S.

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[Medical Treatment of Trichostrongylosis. Efficiency in Lambs Exposed to Continuous Infection. Gordon, H. McL., and Ross, I. C. (1936.) *Aust. Vet. J.* **12.** 3. pp. 111-113.]

Four groups of three lambs three months old were given daily doses of 4,000 larvae (90 per cent. Trichostrongylus spp.) from September, 1935, to March, 1936. The Group I sheep were inoculated twice with *Cl. ovitoxicus* vaccine. Group II were given a solution of copper and nicotine sulphates every three weeks. Group III remained untreated. Group IV received copper sulphate followed by carbon tetrachloride.

All six sheep died in Groups I and III, the increased resistance of Group I to enterotoxaemia apparently not reducing the harmful effects of worm infestation. The animals in Groups II and IV made satisfactory weight gains and did not develop trichostrongylosis, no striking differences being noted between the two groups.

W. L. S.

[Sympathetic Disturbance and Dermatitis in the Dog. Henry, A., and Bory, L. (1936.) *Bull. Acad. vét. France.* **9.** 6. 333-335. (1 fig., 3 refs.)]

The authors have previously described a dermatitis of dogs which is localised to the face. This resembles closely the lesion which follows section of the vago-sympathetic nerve and experiments were carried out on a twelve-months-old dog in order to study this point more closely. Immediately after cutting the left vago-sympathetic nerve no effects were produced, but eleven months later the hair on the left ear began to fall out until the whole ear and an area round the left eye became entirely denuded of hair. The skin became dry and oedematous and the animal continually shook its head. Parasitic infestation was excluded. The dog maintained its appetite and was otherwise in good health.

J. A. N.

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[Some Anomalies in the Titration of Antigens and Antibodies.* Glenny, A. T.]

Many anomalies are encountered in the titration of antibodies and antigens; reliance should not be placed upon any single method of testing. The flocculation value of non-avid (loosely combining) diphtheria antitoxin is greater than the *in vivo* value; a greater *in vivo* value indicates the presence of non-flocculating antitoxin, which, however, combines with toxin *in vivo*.

Multiple toxins and antitoxins are revealed by differences in haemolytic titration using sheep and rabbit cells (Staphylococcus) or by differences between haemolytic, necrotic and lethal action (*Cl. welchii* of different types). The titration of tetanus antitoxin varies with the toxin used because official standard sera are non-avid. The apparent combining power determined against these standards varies with some quality (possibly degree of affinity) of the toxin.

A fractional dose of any toxin requires a relatively smaller fraction of avid antitoxin for neutralisation owing to the reduction of indicating doses present, but relatively more non-avid antitoxin owing to dissociation of the toxin-antitoxin complex on dilution.

Fractional doses of *Cl. welchii* α toxin require more antitoxin for neutralisation in the presence of certain normal sera, because some sera increase the haemolytic power of the toxin more than tenfold.

Some preparations of diphtheria toxoid-antitoxin floccules appear far weaker antigens than toxoid-antitoxin mixtures or toxoid when judged by the response of guinea-pigs to a single injection of 1·0 or 5·0 c.c., but appear

*Abstract of communication made to the Second International Congress for Microbiology, London, July 25th-August 1st, 1936.

stronger when tested by two spaced injections of 0·1 or ·01 c.c. Diphtheria toxin partially modified by formalin appears more toxic when injected intracutaneously in large than in small guinea-pigs, although the guinea-pigs are almost equally susceptible to dilutions of unmodified toxin. Certain toxins (*Cl. welchii*, Wilsdon Type "D") increase in toxicity when kept in phosphate buffer solution. Diphtheria toxoids of the same flocculating value but prepared under different conditions vary greatly in antigenic efficiency.

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[International Biological Standards for Veterinary Use.* Eichhorn, A.]

The importance of standard biological preparations for veterinary use must be recognised not only from an economical standpoint but also for public health reasons, many of the diseases affecting animals being transmissible to man. Investigations on definite standards for veterinary biological products have been very limited, whereas the Permanent Commission on biological standardisation, of the Health Organisation of the League of Nations, has 27 preparations listed for which an international standard has been established.

The establishment of similar international veterinary biological standards is of the utmost importance. It would be of great advantage to have the same or a similar commission include within their sphere of activity the assaying of veterinary products. They could further collect data on the value of the various preparations used for the control of individual diseases and thereby eliminate many products of questionable value.

The discussion covers the necessity for and advantages which would accrue from international standards of veterinary biological products, including anthrax, hog cholera, infectious bovine abortion, rabies, gangraena emphysematosa (blackleg), canine distemper, other virus diseases and diagnostic agents. The standardisation of veterinary biological products would assist in safer international traffic in livestock. Another point which is of international importance is the danger existing in diseases of animals communicable to man.

The creation of an international committee is suggested for the purpose of developing international veterinary biological standards. While it is realised that it is not within the sphere of this Congress to adopt resolutions on this very important and much-neglected phase of disease control, it is hoped that an interest will be created in the minds of those attending the Congress and interested in animal disease control to stimulate activities along this line.

*Abstract of communication made to the Second International Congress for Microbiology, London, July 25th-August 1st, 1936.

Report

NEW SOUTH WALES

REPORT OF THE DIRECTOR-GENERAL OF PUBLIC HEALTH FOR THE YEAR 1934.

This report of 168 pages contains little of direct veterinary interest, but there are some sections which are of general interest to those of our profession who are concerned directly or indirectly with public health work.

Amongst the several legislative enactments which fall within the administration of the Minister for Health through the Director-General of Public Health is one entitled, "Cattle Slaughtering and Diseased Animals and Meat Act." The only references in this report to the work carried out under this Act are brief statements to the effect that efforts were continued for systematic inspection of animals slaughtered for human food in country districts, and that the Act was being amended to enable local authorities to collect fees for payment of qualified inspectors. It is not stated that those inspectors are veterinary surgeons, nor are the conditions of their present employment given.

There is an interesting account of the procedure and results of testing the freezing points of milk by the Hortvet method. The work has been carried out to substantiate the claim that the freezing point is a reliable guide to the presence of added water in milk. The Pure Food Act of New South Wales already provides that the freezing point of milk shall not lie between zero °C. and −0·55° C., within which range water adulteration presumably is detectable. From the numerous tests recorded by the Government analyst this appears to be a reasonable standard for bulk milk; in fact, the freezing points of the individual milks of 158 cows taken on several occasions under varying conditions of lactation and feeding lay between −0·524° C. and −0·535° C. [A paper by Stubbs and Elsdon was published in *The Analyst* of March, 1934, recording the examination of 1,000 milks by this process. The investigation was carried out in England.]

The human population of New South Wales at the end of 1934 was 2,636,460, an increase of 22,684 over the previous year. The annual death rate has shown a remarkable decline in the past 60 years. In 1875 the death rate averaged 18·4 per 1,000, while in 1934 it was less than half that figure, namely, 8·9 per 1,000. The principal causes of death during the year under review, in their order of frequency, were heart diseases, cancer, pneumonia, Bright's disease, accidents and tuberculosis. An interesting chart showing the relative frequency of heart disease, tuberculosis and cancer during the past 60 years is given. Whereas tuberculosis has steadily declined from a mortality rate

N.V.M.A. Divisional Report

WESTERN COUNTIES V.M.A.*

MEETING AT SEALE-HAYNE AGRICULTURAL COLLEGE

PRESIDENT ON HIS WORK AS A VETERINARY INVESTIGATION OFFICER

A meeting of the above Division was held at the Seale-Hayne Agricultural College, Newton Abbot, on the afternoon of Wednesday, June 17th, 1936. The President, Mr. C. V. Watkins, occupied the Chair, and the Division was welcomed by the Principal of the College (W. Henderson Hogg, Esq.).

The following members signed the attendance book: Messrs. Watkins, F. T. Harvey, Chase, Dyson, Mather, Fisher, Norman, Barbour, Willing, R. B. Nelder, R. H. Smythe, Perkins, L. W. Bovett, Fraser, Masson, R. E. L. Penhale, Ascoli, Urquhart, W. H. James and S. J. Motton. Messrs. H. M. Webb and L. H. P. Brito were present as visitors.

Apologies for absence were received from Sir F. Hobday, Major G. W. Dunkin, Messrs. A. R. Smythe, G. Harvey, Gibbings, Thorburn, Wilkins, C. Stephens, R. G. Saunders, Forbes, C. Head, K. Roberts, Richardson, Townson, E. C. Bovett, Colonel Head and Major Ascott.

New Members.—The following gentlemen were unanimously elected members of the Division: Messrs. Urquhart (Exeter), Irwin (Bideford), Conisbee (Axminster) and Webb (Sidmouth).

Presidential Address

The PRESIDENT, Mr. C. V. Watkins now gave the following Address from the Chair:—

I have to thank you all for the honour you have done me in electing me President of the Western Counties Veterinary Medical Association for the ensuing year. I hope the next few meetings will prove of general interest to you and look forward to your co-operation to ensure that they may be so.

I propose to give you an outline of my work in the province as a Veterinary Investigation Officer. My laboratory is set up at the College for the primary purpose of investigating local problems of disease in the animal stock. In this connection I feel I am doing useful work in relation to poultry, as Devon is far up the county list as regards total poultry stock and has just exceeded Norfolk in the number of turkeys being reared this year.

The question of disease in poultry is becoming increasingly important because the results of the rapid increase in the number of birds kept since the Great War are now being reflected in an increased mortality from year to year. Figures obtainable from the returns of laying trials clearly illustrate this fact. The reasons for this are not very hard to find and, in my opinion, are as follows:—

1.—The increased demand for stock from established hatcheries induced many of the latter to breed from stock which was quite unsuited for the purpose on account of bad conformation as potential breeders, the presence of disease and, in many cases, immaturity of the stock.

2.—Many people who were induced to enter the industry had only a very imperfect idea about the management of stock and this became more and more obvious as long as they remained at work.

3.—During the period of this increase of poultry comparatively little aid of a scientific nature was forthcoming to keep the poultry owner out of trouble.

At the present time I am of the opinion that the wholesale distribution of day-old chicks and young pullets and cockerels from uncontrolled hatcheries is one of the greatest drawbacks to the industry. I know of numerous poultry farmers in the province who have purchased chicks from the North of England and have been unable to rear one of these chicks which were advertised as from healthy and "blood-tested" stock. Undoubtedly the latter expression is very misleading and if in some cases stock birds have been so tested, it would seem it has been done as a profitable aid to advertisement rather than as a process which should be used correctly for the eradication of bacillary white diarrhoea and fowl typhoid. These two diseases are so closely related that an agglutination test put up with a *Salmonella pullorum* antigen is effective for use with samples of blood serum from birds affected with *S. pullorum* (B.W.D.) and *S. gallinarum* (fowl typhoid). Laboratory methods are necessary for the diagnosis of both these diseases. I would like to suggest that inquiries *re* the poultry stock be made by practitioners at the time of visits paid to other stock, and that they send me suitable fresh specimens for examination in all cases of disease outbreaks, with some history of the losses and symptoms shown, etc. I can then deal direct with the farmer or through them according to their wishes in the matter.

Another disease which deserves fuller consideration by practitioners is avian tuberculosis. In my experience, this is one of the

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of 154 per 100,000 of the population in 1875 to 40 per 100,000 in 1934, heart disease has gradually risen from a rate of 78 per 100,000 in 1875 to 206 in 1934 and cancer from 31 to 92 in the same period.

The lay-out of the report is in sections, each dealing with a group of allied subjects. An illustrative diagram at the outset shows at a glance the disposition and duties of the staff.

W. K.

most common diseases of poultry stock on small general farms. Birds are often kept under bad conditions and also for a longer time than in the case of most commercial egg producers. The disease should be considered under these circumstances for its bearing upon pig and cattle husbandry particularly, but it also renders the poultry production quite unprofitable in most cases. The pig is especially susceptible to the avian strain of *Mycobacterium tuberculosis* and although cattle do not usually develop any progressive disease from these bacilli, the intradermal tuberculin test with bovine tuberculin may be upset by the production of doubtful reactions. Two courses are then open for investigation; either the poultry can be tested with avian tuberculin, or the normal tuberculin test of cattle can be controlled by a test made at the same time with avian tuberculin, the intradermal test being used. A much larger reaction should be obtained with avian tuberculin if avian tuberculosis has caused the doubtful reactions.

I should like to mention that progressive tuberculosis of cattle has been recorded in Germany as being caused by the avian strain of these bacilli, but only on small holdings in which the association of various farm animals with poultry has been very close indeed under conditions of overcrowding in the same animal houses and on restricted pastures.

Another poultry disease worthy of your attention is so-called "fowl paralysis" or neurolymphomatosis. It has been suggested by Major Dalling recently that the term "lymphomatosis" is a better one for the condition because nerve lesions need not be present although they are commonly found. This disease has probably increased more than any other in recent years. Specimens I have put out in my demonstration in the laboratory illustrate the more important lesions found on *post-mortem* examination. In my opinion when such lesions are determined in a number of cases and in combination with a history of the outbreak of disease and the symptoms shown, they are sufficiently diagnostic for all practical purposes without the aid of a microscope and their detailed pathology.

This disease is receiving attention at the hands of various research workers under the guidance of a Committee of the Agricultural Research Council. Its aetiology is not quite clear at present, but it is generally agreed that an hereditary spread of the disease is to be feared. It is therefore advisable for affected strains of birds to be eliminated from breeding stock. It has been found that various parasitic diseases are factors complicating the losses. These should be determined if present and any birds kept on for commercial egg or table bird production can then be treated according to the findings.

In connection with all disease problems I serve as a connecting link between the practitioner and the larger research centres. I am expected to assist in the collection of material and data for any investigations they may be carrying out and I have their help in relation to the work I am doing myself. For these reasons all veterinary investigation officers meet annually in conference with representatives of the Ministry of Agriculture, the Agricultural Research Council and the central research laboratories at Weybridge, Cambridge and London. To illustrate this co-operation I will make brief mention of one or two investigations under consideration.

A condition very similar to "pine," as found in the Northumberland area, is suspected to occur in sheep using pasture on farms at the edge of Dartmoor. Mineral deficiencies and parasitic gastro-enteritis are thought to co-exist and these will be investigated with the co-operation of the Laboratory, Dartington Hall, Ltd., Totnes; Dr. Green, of Weybridge, and myself. The parasitic troubles will be regularly checked by periodical worm egg counts and total counts in all possible circumstances following natural death or slaughter for the butcher. The mineral balance will be followed in the soil, the herbage, in blood samples taken regularly and in any available bones. Any significant lesions will be investigated for their pathology.

I have attempted to find the cause of the numerous cases of mastitis which occur in certain breeding flocks of ewes. Two forms of the disease are met with. The less fatal form usually makes its appearance 24 to 48 hours after lambing. Generally cold weather with easterly winds appears to predispose to the condition and in most cases wounds at the base of the teats are present. A very acute tumefied lesion of the udder is found and usually one-half of the organ only is grossly affected at first but there is a tendency for the other half to become involved later. The milk flow ceases abruptly and any obtainable discharge is altered markedly, varying from a scanty, thin serous fluid which may be slightly blood-tinged, to a purulent discharge later.

The more fatal form of the disease is known locally as "black-udder." I do not think there is any need for me to describe this condition to you as I feel sure most of you have encountered it. I will merely say that a gangrenous condition of the udder is set up following an acute flare-up of the disease.

In both forms of the disease I isolated mixed cultures from the samples of udder discharge. The only significant bacteria obtained were haemolytic toxigenic staphylococci. Dr. Minett kindly determined these for me and gave me to understand that they conformed to a few cases he has investigated himself.

An attempt at preventative treatment by

means of the injection of a toxoid prepared by Dr. Minett from the staphylococci isolated from these cases was made. Unfortunately the farmer concerned did not help matters as he failed to make the temporary distinguishing marks permanent as promised, and also sold some of the ewes in the treated group. A correct summing up was therefore out of the question. I intend to repeat the work, however, as opportunity offers, because the disease is fairly prevalent and is very upsetting to the farmer concerned as a number of lambs may have to be bottle-reared or a foster mother found for them.

I have had very generous help from Mr. E. L. Taylor in connection with parasitic diseases. I illustrate a few specimens in my laboratory.

I proposed to carry out an investigation to determine the secondary host of the lung worm of silver foxes—*Crenosoma vulpis*. This was planned some months ago with Mr. Taylor and Mr. L. A. Harvey, the Zoologist of Exeter University. Unfortunately, Mr. Taylor's illness intervened and since then slugs and snails have been implicated in the life history of this parasite by Wetzel. We will therefore try to confirm this finding and at the same time we hope to find out if the wild fox is a reservoir of the parasites for the silver fox.

The foregoing gives some indication of the working of my department under the Ministry of Agriculture's Advisory Scheme. The bulk of the work I do is diagnostic in character and I hope I can interest you for a few minutes later when you see the facilities of some of the laboratories here.

I will conclude by thanking you once again for electing me your President for the ensuing year and by expressing the hope that all our meetings are enjoyable ones and that the year is a prosperous one for you all. (Applause.)

Demonstrations

Demonstrations were given by members of the Seale-Hayne College Staff as follows:—

(1) Mr. C. V. Watkins, M.R.C.V.S., D.V.S.M.: This included mounted specimens of various diseases, principally of poultry, and a few microscopical specimens. Among the latter were slides showing M'Fadyean's staining reaction of anthrax bacilli, sheep lice, Aspergillosis in lung of chick, larval forms of *Oslerus osleri* from trachea of a Cairn terrier, neuro-lymphomatosis nerve lesion, bacillary white diarrhoea of pancreas of a hen, and Johne's disease of duodenum of a sheep.

(2) Mr. A. Beaumont, M.A. (Cantab.), the Advisory Mycologist, deputised for Mr. N. Staniland, A.R.C.S., D.I.C., the Advisory Entomologist, and outlined work done by these combined departments on the control of two important types of plant disease: Eelworm diseases of narcissi, etc., and (*b*) virus diseases such as "fire" of tulips. Specimens of the mite (*Acarapis woodi*), the cause of "Isle of Wight" disease of bees, were demonstrated microscopically in the breathing tubes of affected bees.

(3) Mr. F. R. Horne, M.A. (Cantab.), the head of the Biology Department of the College, gave a demonstration of all the common poisonous plants of the province, including the following: *Ranunculus scleratus* (celery-leaved buttercup), Helleborus spp., *Aconitum napellus*, Papaver spp., *Conium maculatum*, *Oenanthe crocata*, *Senecio Jacobea* (ragwort), Cuscuta spp. (Dodder), *Hyoscyamus niger*, *Atropa belladonna*, *Arum maculatum* (wild arum), *Colchicum autumnale*, Lupinus spp., Equisetum spp., *Mercurialis perennis*, *Taxus baccata*, *Aethusa cynapium*, *Chelidonium majus* (Greater Celandine), *Lolium temulentum*, and Claviceps spp., (ergot in cereals and grasses).

(4) Mr. A. Blenkinsop, B.Sc., the Advisory Chemist, gave a demonstration of his methods for determining the following constituents in soils, etc.: Phosphate as P_2O_5, potassium as K_2O, calcium as CaO, magnesium as MgO, manganesee as MnO, and sodium as Na_2O. A colorimetric method was used in all cases, and the microscopic colorimeter was shown in use. He also showed the determination of the *p*H of soils by the quinhydrone electrode method.

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The Principal of the College (Mr. Henderson Hogg) very kindly entertained the members to luncheon and tea.

At the termination of the meeting the members tendered their sincere thanks to the President for the excellent programme he had arranged, to the members of the College staff for their demonstrations, and to the Principal for having made these demonstrations possible, and for his hospitality.

S. J. Motton, *Hon. Secretary.*

THE NEW ULTRACENTRIFUGE INSTALLATION AT THE LISTER INSTITUTE

On September 29th Professor Svedberg, of Upsala, and a number of interested physicists, biochemists, and biologists were entertained at the Lister Institute on the occasion of the completion of the new ultracentrifuge plant. The new laboratory is specially designed and equipped for investigations into the physical nature of very small particles, particularly protein molecules, but it is hoped also to extend its use to the study of the less well-defined entities such as viruses, phages, and antibody complexes. The ground floor is largely taken up by two ultracentrifuges and their auxiliary machinery. Both machines, which were made in the workshops of the University of Upsala to the design of Professor Svedberg, have optical arrangements which make it possible to observe and photograph the contents of the rotating cell.

From The Veterinarian

November, 1836

From Mr. T. W. Mayer's contributions on "The Past and Present State of Veterinary Science."

The progress of veterinary science, though marked and distinguished by its anatomical, physiological, and pathological details, which were slightly glanced at in the preceding paper, is further visible in the improved state of the members of the profession, both as regards education and respectability.

Moreover, the lengthened period of the students' stay at College, the great advantages they now experience there over those who studied at an earlier period, together with the persons studying being previously better informed, prove that the science must have made some progress to need such important additions to the former systems adopted, and which have tended much to improve its character.

The science has progressed with such rapidity as to require a periodical devoted to its interests. Such a periodical has been established now for several years, and still exists, through whose means the profession has been much advanced, and in whose pages much valuable information has been conveyed. It is much, however, to be regretted, when we come to consider the number of persons* who have graduated as veterinary surgeons, that the number of contributors to this valuable veterinary journal is so small, and that it is not better supported by those who do occasionally contribute to it. If the pages of this periodical are distinguished by their gentlemanly tone throughout—if any improvements that are thought will be congenial to the advancement of veterinary science are fairly and candidly stated—if arguments are used instead of threats and menaces, and the common sense of individuals is appealed to, not their passions and prejudices, I say that that periodical is deserving the support of every member of the profession.

And now, in drawing the progress of the science to a close, I would observe that its anatomical part is no longer disgraced by the description of a gall-bladder, its physiological details by the story of nerves being long small bones, its pathology by such maltreatment of inflamed lungs as that of Merrick, nor its operative surgery by Foster's cure of splents. But were there no obstacles in the way of this progress?—were its paths always straight and even? Yes; there were obstacles that it had to conquer which, in some men's minds, might have been considered insurmountable. And what were these obstacles? Nearly all the passions of the human breast—lying, evil speaking, anger, hatred, and all uncharitableness—popular prejudice—why? Because it destroyed those superstitious notions and practices which were deemed absolutely necessary for the safety and protection of their stock; because the blacksmiths, cowleeches, etc., considered the art as an innovation on their system, and therefore they declared war against it with all their main and might. Such were the obstacles the science had to contend against from without.

Within itself it was a mass of error—no well founded principles—no data to go upon—nothing to take for granted, as the basis on which to reason—it had everything to find out—in short, false notions on anatomy, physiology, and pathology, were the internal obstacles to its advancement. Let us hope that the days are at hand when the obstacles which prevent the future progress of the profession shall be removed, and we shall behold the glorious light of the mid-day sun.

*The total number of veterinary surgeons published in the list of 1834 is 624 and the number of contributors to *The Veterinarian* at the beginning of this year was only 100.

In Parliament

The following questions and answers have been recorded in the House of Commons recently:—

Milk (Pasteurisation)

Mr. R. C. Morrison asked the Minister of Health whether, in view of the recent epidemic in Bournemouth which involved 500 cases of infection and 40 deaths, he proposes to take steps to make the pasteurisation of milk compulsory?

Sir K. Wood: I am, of course, fully aware of the facts of this case, but I cannot undertake to introduce legislation on the subject at the present time.

Mr. Morrison: Did not the right hon. Gentleman make a speech recently in which he said that pasteurisation would have prevented this epidemic?

Sir K. Wood: I will send the hon. Member an exact copy of what I said. There is no doubt that in this case it had an important bearing on the matter.

. . . . .

Milk Marketing

Mr. Hall-Caine asked the Minister of Agriculture the number of tuberculin-tested milk producers who are now outside the operations of the Milk Board, and what percentage of the total output of milk for human consumption their sales represent?

Mr. W. S. Morrison: It is estimated that about 1,400 producers in England and Wales are selling tuberculin-tested milk outside the Milk Marketing Scheme, and that their sales represent approximately 5 per cent. of the total quantity of milk sold for human consumption.

Mr. C. S. Taylor asked the Minister of Agriculture whether he will make representations to the Milk Marketing Board so that the sale of fresh skimmed milk be permitted in this country, in view of the fact that large sales of foreign skimmed milk in tins are still permissible?

Mr. W. S. Morrison: The Milk Marketing Board have not prohibited the sale of fresh skimmed milk. I understand that any person may purchase whole milk at the regional price, separate the cream and sell the resulting skimmed milk in liquid form; but in such cases the board are not prepared to allow to the purchaser a manufacturing rebate.

The House of Lords has passed the following resolution: "That a Select Committee be appointed to consider whether any measures, and if so what, ought to be taken for better protection of agriculture and the land against the ravages of rabbits, and to what extent, if any, the prohibition of the use of gin-traps would affect the attainment of the object aforesaid."

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Nov. 23rd.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, 4 p.m.

Nov. 24th.—Annual General Meeting of the Dumfries and Galloway Division, N.V.M.A., at Dumfries, 11.45 a.m.

Nov. 25th.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, at the Society's House, 1, Wimpole Street, W.1, 5 p.m.

Nov. 26th.—R.C.V.S. Examination fees due.

Nov. 27th.—Meeting of the Royal Counties Division, N.V.M.A., at Camden Town, 5 p.m.

Nov. 30th.—All changes of addresses to be sent to the Registrar, R.C.V.S., for inclusion in 1937 Register.

Dec. 3rd.—Meeting of the Central Division, N.V.M.A., at the Conway Hall, Red Lion Square, W.C.1, 6.30 p.m.

Dec. 3rd.—R.C.V.S. Written Examinations.

Dec. 5th.—Meeting of the North of England Division, N.V.M.A., at Newcastle-on-Tyne, 2.15 p.m.

Dec. 7th.—R.C.V.S. Oral Examinations commence in Dublin.

1937
Jan. 8th.—R.C.V.S. Council Meetings.

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PERSONAL

Marriage.—Thompson-Shane. On November 17th, at St. Aidan's, Drumcondra, Dublin, Paul Geoffrey Melland Thompson, third son of the late J. R. M. Thompson, Kniveton House, Ilkeston, and of Mrs. Thompson, Oban House, Beeston, to Alice Edith Shane, only daughter of Fredrick and Mrs. Shane, 19, Hollybank Road, Drumcondra, Dublin.

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R.C.V.S. OBITUARY

Richards, Hubert William, 23, Devonshire Terrace, Skipton, Yorks. Graduated, London, December 18th, 1925; died November 12th, 1936, aged 37 years.

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BRITISH ARMY TEAM'S SUCCESS IN NEW YORK HORSE SHOW

For the first time since the event was instituted a British Army team, on November 10th, won the International Military Challenge Trophy at the close of the National Horse Show held in New York. The contest, in which military teams from seven nations—the United States, Great Britain, France, Canada, the Irish Free State, Sweden, and Chile—competed, took place before the largest and most enthusiastic crowd in the Show's 53 years of history.

In winning the International Trophy the British team secured three of the most important military events in the Show—the international individual military championship was won by Mr. J. A. Talbot Ponsonby, the 7th Queen's Own Hussars, on his bay gelding Kineton, and the Brooks Bright Foundation Challenge Cup had already fallen to Great Britain. The Irish Free State, Great Britain, the United States, and Chile, were tied after the first round's jumping; but four almost perfect rounds by the British team secured the victory. The Irish Free State was second and the United States third.

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MEMORIAL TO SIR WALTER FLETCHER

A memorial portrait bust of Sir Walter Fletcher, by Miss Dora Clarke, was presented to the National Institute of Medical Research at Hampstead on November 11th by Lord Balfour of Burleigh, on behalf of the Medical Research Council, of which Sir Walter Fletcher was Secretary from 1914-33. More than £2,300 was subscribed for the memorial, and after meeting the cost of the portrait bust the remainder is being used for a Walter Fletcher Laboratory at Mill Hill. Professor G. M. Trevelyan, O.M., spoke of the great human qualities which Sir Walter Fletcher brought into his service in medical research, and Sir Frederick G. Hopkins stressed his characteristics as an investigator, administrator, and devotee to duty. The bust was formally accepted by Sir Henry Dale, President of the Institute.

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SWINE FEVER IN CUMBERLAND

Captain R. Simpson, F.R.C.V.S., D.V.S.M., Cumberland County Veterinary Officer, reported to the county council at their quarterly meeting held in Carlisle on November 4th that a disquieting feature of the swine fever position in the county was that the pig markets at several centres appeared to have become infected and secondary outbreaks from these sources were developing as a consequence. Special measures had been taken to secure effective disinfection of the saleyard premises concerned, and the Ministry of Agriculture proposed as a precautionary measure to trace and examine all contacts which had passed through these markets during the last two months. Captain Simpson also commented upon the laxity of pig owners in not reporting suspected cases, and in other directions, and added, "The development of the bacon industry in the county is leading to increased marketing and dealing in pigs, and from every point of view it is desirable that pig-owners should, in their own interests, co-operate in the control of the incidence of swine fever."

It was stated that the Disease of Animals Sub-Committee had decided to ask the Ministry to consider reverting to the former policy of compulsory slaughter of all diseased and in-contact pigs, and the payment of compensation with a view to securing more adequate control of the disease and the earlier reporting of suspected cases.

COUGHING IN PIGS

In the course of a letter on the above subject recently published in *The Times*, Mr. H. G. Robinson, Principal of the Midland Agricultural College, Sutton Bonington, Loughborough, says:

"For some time at this College we have had trouble from periodic outbreaks of coughing in our pigs that are being fattened for bacon. Every avenue of cause was explored, and as a last resort sections of the lungs were sent to Dr. J. L. Berry, of Birmingham University, for microscopic examination.

"The following report from Dr. Berry is of particular interest in view of the widespread outbreaks of coughing that are experienced among pigs throughout the country.

"'. . . The changes in the lung were very similar to the changes observed in human lungs in dust disease. In this complaint the particles of dust irritate the passages leading to the lung. The excess of dust causing irritation produces a cough to clear the passages of irritating matter, but the deep breaths which precede the cough also help to lift this matter into the lungs. Thus further irritation is set up which inflames the lungs in a patchy way.

"'This patchy inflammation could be clearly seen under the microscope, and such areas being near to the membrane covering the lung (pleura) also produced a local pleurisy. This in turn causes the two membranes to stick together and, when the animal is butchered, the lung is found to be firmly bound to the chest wall.

"'The lung irritation produces further coughing, and the sections showed that the animal by forced coughing had further damaged the lung by over-distending the normal parts of the lung.

"'Certain sections were examined which revealed the inhaled particles of dust, and these particles were measured in the lung itself. These were found to vary from about three to twenty one hundred-thousandths part of an inch across. Thus there could be no doubt that the irritating material was in the form of dust.

"'The opinion that the change in the lung of the pig was due to dust was inescapable, and the only way of avoiding the trouble was to prevent the breathing of dust by the moistening of the dry feed similar to wetting a floor in order to lay the dust.

"'It may be further remarked that any disease of the lungs is bound to interfere with the health of any animal, and it is not therefore surprising that the nutritive demands of the animal on dry feed are high in proportion to the quality and quantity of the meat produced at slaughter.'

"Since receiving this report alterations in our system of feeding have been made whereby the meal that is fed to pigs is damped prior to feeding instead of following the former method of giving the food in the dry state. An immediate improvement has taken place in the incidence of coughing, and it is highly probable that many pig feeders can, by adopting similar precautions, realise a similar result."

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LEGAL NOTES

"Knowledgeable" Farmer Caught Out Over Swine Fever.—A Cumberland farmer who boasted that he had always hitherto managed without veterinary aid was reproved for his foolishness by the Silloth magistrates on November 5th and fined £15 and costs for failing to give notice of pigs being, or suspected of being, affected with swine fever. In addition minor penalties were imposed for failing to keep a record of animals moved to and from his premises, the total of the fines and costs being £17 5s.

Evidence was given by Captain T. W. Woodhead, M.R.C.V.S., of Carlisle, an Inspector of the Ministry of Agriculture, who said that he had found that there was an entry in the defendant's book recording the movements of animals in connection with the removal of seven pigs and of their disposal at Carlisle market on August 10th. When the witness made inquiries about the pigs that were on the premises at the time of his visit, the son told witness he must see his father.

When witness saw the defendant on the farm premises he informed him that he was an inspector under the Diseases of Animals Act, and that he did not intend to leave the farm until he had seen every pig on it. As the result of his inspection, he saw a total of 43 pigs and two dead ones. Six store pigs and four small pigs showed definite symptoms of swine fever. Defendant was served with the requisite forms to fill in, and he was asked as to the disposal of certain carcases.

Witness again visited the farm on October 3rd, accompanied by Superintendent Graham, and made a *post-mortem* on seven dead pigs. This showed symptoms of swine fever. Defendant was given certain forms to fill in regarding movements of his swine. After the inspector had got particulars regarding the movement of pigs, the defendant was asked by Superintendent Graham if he had any knowledge of the animals having swine fever and his reply was that he had not. When asked about having consulted a chemist and the purchase of some medicine for the pigs, defendant admitted he had sent his son for some stuff for the pigs. When the son was asked if he had not been advised to report the case to the police, the defendant interposed and replied: "You are bringing another man and his business into it, and you have no right to ask such questions."

In reply to Superintendent Graham, witness stated it was found that the defendant had sold 22 store pigs in Carlisle Auction Mart on September 28th, and the disease had been confirmed in respect of these pigs in different sets of premises. The disease had been certified on five premises and suspected on the other two. The pigs in the latter two cases had either died or been killed by the owners before the diseased animals could be inspected.

John C. Millner, the son, giving evidence on behalf of defendant, said they had no pigs ailing at the time these visits of the inspector and the police were supposed to have been made.

Superintendent Graham put it to the witness that it had been to their detriment in not having engaged a veterinary surgeon to look at the pigs.

Witness denied that he asked the advice of the chemist about the pigs.

Defendant, in his statement to the Bench, asserted that during all his farming experience he had never had a charge of that description brought against him, and he was not pleading ignorance with regard to pig diseases. Not one pig bought or sold from his place had ever been suffering from or caused any infectious disease. He had never employed a veterinary surgeon and did not see that that had ever been to his detriment.

The Chairman advised defendant that in future, if he had any suspicion of illness among

his stock, he should send for a veterinary surgeon or the County Veterinary Officer. If defendant had done that in the first instance he would not have been before the magistrates that day. It was very unfortunate for him that he did not.

* * * * *

Possession of Unsound Meat.—The *Meat Trades Journal* reports that at the Guildhall Justice Room before Alderman Sir William Coxen, the Co-operative Wholesale Society (Ltd.), were summoned for being the persons into whose possession was conveyed a pig carcase weighing 85 lb., which was afterwards condemned as being unfit for the food of man.

Mr. W. E. J. MacDonnell, the Assistant City Solicitor, said the Section of the Act (47) under which this summons was issued, imposed an absolute prohibition on the sending of unsound meat to the London markets. On the morning of July 27th, a salesman employed by the defendant company called the attention of one of the sanitary inspectors to the carcase in question, as a result of which it was seized. According to the medical officer's report, the carcase was diseased, there being abundant evidence both of acute pleurisy and tuberculosis.

Mr. L. B. A. Grace, M.R.C.V.S., veterinary surgeon for the City, described the condition of the carcase in detail, and said that after seizure he received a visit from representatives of the defendant company, who explained to him that they had a system of marking carcases which were suspected. On arrival in the meat market the attention of an inspector was called to these as soon as possible.

Called for the defence, John Malpas, a salesman employed by the defendant company at Smithfield, stated that this carcase was received from their bacon factory at Shepton Mallet with six others. Witness was not satisfied with the appearance of the one, and had it "hung back" to await the attendance of an inspector.

"I never had any intention at any time," the witness added, "of exposing that carcase for sale. I didn't at any time intend that it should be used for the food of man. I, myself, sent for the inspector."

Mr. MacDonnell: The object of sending these carcases from Shepton Mallet was sale?—Subject to examination.

Mr. Henderson: That is the whole point, subject to examination. This is a case of great public importance, and I do not think it can be suggested that the defendant company has been guilty of any moral delinquency.

Counsel went on to point out that no meat was exposed for sale until it had passed inspection, and, as in this case, when there was any suspicion that anything was unsound, the market inspector was called in. His submission was that in the absence of any intention of sale there could be no conviction.

Sir William Coxen: What was the intention of the bacon factory? They sent up six sound and one unsound carcase. What did they intend to be done with them at Smithfield?

Mr. Henderson: There is no evidence as to what they intended. The witness Malpas was the person who had to decide that, and you have heard him say that he intended to do nothing with it until the inspector had seen it. There never was at any time any intention of selling this carcase for the food of man. If there is a conviction in this case it will mean that every time unsound meat comes into Smithfield an offence is committed. The only inference to be drawn in this case is that the carcase was sent to Smithfield in the pious hope that Malpas would find it fit for sale.

Sir William said he had listened very carefully to the evidence and to counsel's submission, and had come to the conclusion that this pig carcase was "deposited for the purpose of sale," and that the offence had been proved. In view of the evidence that the company's employee himself called in the inspector to see this carcase, he thought the case could be disposed of by dismissing the summons under the Probation of Offenders Act on the payment of ten guineas costs.

Mr. Henderson: That, of course, is a conviction, and I shall ask you to state a case for the High Court.

The Clerk of the Court: Upon what point of law?

Mr. Henderson: That there is no evidence of intention.

Sir William: I will certainly state a case if you give the proper notice.

* * * * *

WEST SUSSEX AND THE ERADICATION OF BOVINE TUBERCULOSIS

At a meeting of the West Sussex County Council it was decided, on the recommendation of the Chief Veterinary Officer, that the tuberculin testing of herds under the Milk (Special Designations) Order, 1936, should remain in the hands of the local veterinary surgeons, provided that these are approved by the county council; that farmers should remain responsible for the employment and payment of such veterinary surgeons, but that as the responsibility of granting "tuberculin tested" licences rests with the county council, it is desirable, in order to ensure uniformity throughout the county, that their representative should supervise the testing of such herds. It was accordingly agreed that for the purpose of the half-yearly certificates, tuberculin tests should be carried out by the local practising veterinary surgeons under the supervision of the council's Chief Veterinary Officer.

It was also decided to introduce a voluntary scheme for the eradication of bovine tuberculosis, this to be based on free tuberculin testing by the county council's veterinary officers. Under this scheme, which is limited to "accredited" herds, these herds will again be handed over to practitioners to test and maintain in a tubercle free condition after eradication has been effected.

At a meeting held between the veterinary surgeons practising in the county and representatives of the county council the undermentioned veterinary surgeons, who attended, unanimously decided to give the scheme their complete support: Messrs. T. Bolton, A. Fowler, E. W. Garry, J. W. Pritchard, H. Scott Dunn, S. Smith, H. Taylor, M. W. White and Miss M. L. Somervail.

Following is the text of a statement regarding the scheme issued subsequent to the joint meeting:—

With the object of encouraging farmers to free their herds from tuberculous infection, the county council are prepared, through their Veterinary Department, to undertake free tuberculin testing of herds throughout the county provided that:—

1. This scheme shall be confined to herds in respect of which "accredited" (grade "A") licences have been issued.

2. Preference shall be given to herds maintained chiefly by home bred stock. "Flying

herds" shall be considered only under special circumstances.

3. Application to enter the scheme shall be made in writing to the Clerk of the county council.

4. The applicant shall give a written undertaking to conform with the principles of the scheme as laid down.

5. The acceptance of all applications shall be in the hands of the Veterinary Joint Sub-Committee.

6. The Council shall reserve the right to terminate the scheme at any time or to make any alterations as may be found necessary at any period.

7. The council shall reserve the right to limit the number of herds to participate in the scheme at any one time.

8. The council shall make a nominal charge of £1 per herd per annum to cover the cost of the tuberculin.

9. All tuberculin tests shall be carried out by the Chief Veterinary Officer or by one of his assistants.

10. The Chief Veterinary Officer shall have the right to enter the premises of any farmer participating in the scheme at any reasonable hour for the purpose of inspecting the methods of isolation or segregation which are in operation.

11. Should the council be convinced that any farmer taking part in the scheme is not making every reasonable endeavour to carry out the principles of the scheme, they shall reserve the right to remove his name from the scheme after due warning has been given.

12. The free tuberculin testing shall be continued until such time as a herd is declared free from infection. A herd shall be so declared after there have been two consecutive free tests at an interval of not less than 60 days. When a herd is declared tubercle free then free testing shall cease.

(It is thought that when a herd is declared free, the object will be realised and it should then be the responsibility of the owner to maintain it in this condition. The owner of such a herd would be entitled to apply for a "tuberculin tested" licence or enrolment under the "attested herd scheme.")

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BACTERIOLOGICAL GRADING OF MILK

In our last issue we reproduced correspondence and an annotation relative to the above appearing in a recent number of *The Lancet*. Mrs. Foot, the correspondent in question, states in a further letter published in that journal, and in reply to the comment on her letter embodied in the annotation: "I do not, as you state, contend that "in spite of the favourable conclusions recorded in the recent report published by the Medical Research Council, this (the methylene-blue) test is inferior to the plate count and the coliform test." I have no knowledge of research and I do not pretend to know anything about the scientific side of the work. I look upon the subject from the point of view of the practical producer of clean milk.

"When the Ministry of Health proposed in their Draft Order of January 24th, 1936, to abolish the coliform test, I made these experiments out of pure curiosity to find out whether it was a fact that the methylene-blue test would be as safe a test for milk as the old plate count and coliform test. To my surprise, I found that the methylene-blue test did not indicate the presence of *Bacillus coli*, even when manure had been deliberately introduced. It is entirely owing to my experiments that the Ministry of Health decided to reinstate the coliform test.

"Professor Wilson's summary of the results of the 13 samples tested by him is misleading, for he bases his conclusions on a keeping-time of eight-and-a-half hours (winter standard), whereas mine dealt entirely with the standard prescribed by the Ministry of Health in their Draft Order of January 26th—*i.e.*, five-and-a-half hours in winter and four-and-a-half hours in summer. The report of the Medical Research Council may have recommended a keeping-time of eight-and-a-half hours in winter, but the fact remains that this is not the standard laid down by the Ministry of Health, and it was upon the conditions prescribed by their Draft Order of January 26th that my arguments were based. On the 13 samples sent ten would have passed the standard prescribed by the Ministry of Health in their Draft Order published on January 26th.

"I have never attempted to criticise the methylene-blue test itself, as I do not pretend to have sufficient knowledge to enable me to do so. What I did criticise was its adoption by the Ministry of Health with a keeping-time of five-and-a-half hours in winter and four-and-a-half hours in summer—coupled with the abolition of the coliform test—as a standard for really clean milk.

"Another serious disadvantage of the keeping-time of five-and-a-half hours is that the conscientious producer has no knowledge of the actual standard of his milk—*i.e.*, he does not know whether it has passed the prescribed standard without anything to spare, or whether it would perhaps have kept eight or ten hours. In other words, he does not know whether his methods of production are such as to give him a good margin of safety, or whether he is close to the danger line. With a bacteria count of 30,000 one always knew where one stood. For instance, the average of the bacteria counts taken of my milk by the Ministry of Health during the last twelve months is 3,190, with no *B. coli*, which means that I know that my methods are resulting in a high standard. Under the old Order if a producer received from the Ministry a report that his milk showed a bacteria count of say 29,000, he would know that something was wrong somewhere, and he would endeavour to ascertain where the weakness might be. Under the new test he is working more or less in the dark; all he knows is that his milk has passed the prescribed standard, and he has no idea by what margin it has passed."

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AN EXPERIMENT IN MILK CONTROL

Following is an annotation published in a recent issue of the British Medical Journal: "The bacteriological examination of milk sold in the Royal Borough has for many years been carefully attended to by the medical officer of health for Kensington, on the instructions of the Public Health Committee of the Council, and his reports have often been fertile in good ideas. As illustrating the great importance of pasteurising all milk, and especially that which has been brought into the area in bulk, some figures recently submitted in Kensington are most instructive — if, indeed, the Bournemouth epidemic leaves any need for further instruction. Eight samples of 'certified' milk recently examined bacteriologically were very satisfactory, as were two of 'Grade A, Tuberculin Tested'; but a third sample of the latter was found to contain 546,000 organisms per c.cm., with *B. coli* present in 1/1,000 c.cm. A further

eight specimens of 'pasteurised' milk had low bacterial contents, though *B. coli* was reported to be present in three of them. Lastly, two reports on raw milk disclosed respectively 410,000 and 720,000 organisms per c.cm., with *B. coli* present in 1/1,000 c.cm. in both cases. An experiment was then carried out by sampling raw milk from a number of farms delivered in London in bulk in a glass-lined tank: 768,000 bacteria per c.cm. were found, with *B. coli* and *B. tuberculosis*. Three separate samples were then taken at varying intervals after pasteurisation was complete, disclosing respectively 990, 1,610, and 2,720 organisms, with no *B. coli* and no tubercle bacilli. Yet another sample taken after the milk was bottled showed 2,500 organisms, with *B. coli* present but *B. tuberculosis* absent. Apart from proving the efficiency of the pasteurising plant, the result suggests that the bottles had been imperfectly cleansed."

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DISEASES OF FISH

The Diseases of Fish Bill, introduced by Lord Feversham in the House of Lords, has for its object the prevention of the spread of disease among salmon and freshwater fish in Great Britain.

The Bill provides that it shall not be lawful to import any live fish of the salmon family, and that it shall not be lawful to import any live freshwater fish or live eggs of fish of the salmon family or of freshwater fish unless the fish or eggs are consigned to a person licensed to receive them. Exception is made in the case of eels which are shown to the satisfaction of the Commissioners of Customs and Excise to be intended for human consumption.

Power is given to the Minister of Agriculture and Fisheries to issue licences, subject to stated conditions. Power is also given to the Minister to declare areas to be infected areas and to prohibit the transport of live fish or of eggs of fish from those areas. Offenders against the provisions of the Bill are made liable on summary conviction to a fine not exceeding £20, or in the case of a second or subsequent conviction a fine not exceeding £100.

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FOURTH INTERNATIONAL CONGRESS OF EXPERIMENTAL CYTOLOGY

The above Congress was held at Copenhagen on August 10th-15th under the Presidency of Professor T. Huzella, Dr. Albert Fischer acting as local President, and covered a very wide range of subjects. Two sessions were devoted to the physical chemistry of the cell, one to histo-chemistry, one to cell respiration and cell metabolism, and four to experimental morphology. An important feature of the Congress was the exhibition of the Carrel-Lindbergh perfusion apparatus in operation, which was personally demonstrated by Alexis Carrel and Colonel Lindbergh. The former also exhibited a number of lantern slides showing photomicrographs of histological sections of organs grown in the apparatus for different periods. When these were compared with similar slides of control organs, remarkably little histological difference could be detected between the normal and explanted tissue. One evening was set apart for the exhibition of cinema films which showed a higher average standard than at any of the previous Congresses. Films demonstrating tissue cultures of gliomata and cells infected by psittacosis virus, were exhibited by John Bland who had collaborated with the late Ronald Canti in making the films.

AWARDS FOR CANCER RESEARCH

During the Second International Congress on Cancer held recently in Brussels, the presentation of a prize awarded by the International Union against Cancer was made to Professors E. L. Kennaway and J. W. Cook of the Research Institute of the Royal Cancer Hospital (Free), Fulham Road, London. The prize, which was for scientific work on cancer, was the gift of the Union Minière de Haut Katanga, the well-known Belgian firm engaged in the production of various metals including radium, and consisted of 50,000 francs together with 50 milligrams of radium for use in research work. Professor Kennaway is professor of experimental pathology in the University of London and Director of the Research Institute of the Royal Cancer Hospital (Free), London, and the author of several papers on biological chemistry and cancer. Professor Cook is research chemist at the Royal Cancer Hospital and professor of chemistry in the University of London. He has written numerous papers on organic chemistry, particularly in relation to cancer.

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H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned have been published recently. Copies can be purchased through any bookseller, or indirectly from H.M. Stationery Office, at the following addresses: London: Adastral House, Kingsway, W.C.2, and 28, Abingdon Street, S.W.1; Cardiff: 1, St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120, George Street.

	Price Net. s.	d.	*Post Free.* s.	d.
HEALTH, MINISTRY OF				
Circular 1580. Milk (Special Designations) Order, 1936. To County Councils and Sanitary Authorities (England). November 5th, 1936. (33-9999).	0	1	0	1½
Milk, Graded, Bacteriological Tests for. (Memo 139/Foods) January, 1937. (32-9999). ...	0	3	0	3½
COMMAND PAPERS				
[5293.] Agricultural Research Council. Annual Report for the Period October, 1933-September, 1935 ...	2	0	2	2

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Mr. W. S. Morrison, the new Minister of Agriculture, has appointed Mr. R. H. Franklin to be his Principal Private Secretary, and Mr. A. W. Keeble and Mr. H. Gardner to be his Assistant Private Secretaries. Mr. Morrison has also appointed Mr. I. L. Orr-Ewing, M.P., to be his Parliamentary Private Secretary (unpaid).

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An effort is being made to establish a "tubercle-free area" in the south of Warwickshire in co-operation with Mr. K. D. Downham, the Advisory Veterinary Officer of the Harper Adams Agricultural College. There are already twelve tubercle-free herds in the selected area, and it is hoped that the example of owners of these herds will have some influence on the others. The first tests will be carried out by Mr. Downham without cost to the owners.

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Seventeen cats were taken from a house in Wesley Road, Southend, and destroyed at a cats' home. They belonged to a woman who had not left the house since her husband died seven years ago and who was taken to hospital. The cats were fierce, and were caught with difficulty.

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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SHOCK BY ELECTRICITY

To the Editor of the Veterinary Record

Sir,—Although Mr. Motton's unfortunate and painful experience is definitely of sufficient interest to make it worth recording, I consider that it has little or no bearing on the subject of electrical stunning.

As pointed out by Mr. Tweed, the production of anaesthesia by electricity is directly dependent upon the path of the electrical current which should be through the brain and not from hand to feet as in the case in question. It is obvious, therefore, that unless a person is subjected to an electrical shock in a manner similar to that used for stunning animals such an experience cannot fairly be used in any argument either for or against electrical stunning. I contend that Mr. Motton's statement, "I was able to stand immediately the current was turned off," conclusively proves this fact, since after passing a similar current through the brain of an animal for three seconds it would certainly not be able to rise.

In this connection it may be of interest to relate that during my early experiments with the "Euthanator," using A.C. 240 volts, 50 cycles, I had to destroy a large Great Dane and in so doing let the animal fall away from the wall plug when the current was switched on. This jerked the plug from its socket immediately but although the dog only received a momentary shock it proved sufficient to keep it stunned while the plug was being replaced.

In conclusion, I should be very interested to know how the kennelman "was being shocked from the earth" (I presume that Mr. Motton means the earthing wire or connection on the drier or plug) since no reference is made to a fault in this connection.

Yours faithfully,

Staddlecote, C. R. Golledge.
Trowbridge, Wilts.
November 16th, 1936.

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To the Editor of the Veterinary Record

Sir,—I am indebted to Mr. Tweed and Dr. Wooldridge for picking up the thread in connection with my letter which appeared in your issue of November 7th.

Some years ago the Royal Society of Medicine collected for me the available literature printed in English, dealing with death and injury by lightning and electricity, and some of the references will be found in the Annual Report of the N.V.M.A. for 1927. From that literature it appeared to be clear that very varying results could follow contact with electricity. There is no doubt about the great importance attaching to the path followed by the current, but that is not the "whole point," as Mr. Tweed affirms: voltage, amperage, efficacy of contact, duration of contact, state of skin, individual susceptibility, etc., cannot be disregarded.

Mr. Tweed mentions slaughtermen who allowed 70 volts to run from one hand to the other, but 50 volts A.C. have proved fatal, although I do not know what was the path taken in this case. Voltages of 110 and 75 have killed men, but there is the case of the engine driver who for bets for beer, made a habit of catching hold of a 500 volt clamp with both hands and letting go again. One day he accidentally came in contact with the same clamp under the same conditions and collapsed dead on the floor. This and other references will be found in "Industrial Hygiene and Medicine" by Hope, Hanna and Stallybrass.

All this just points to the uncertainty of results. When we are dealing with voltages in the region of 70, and we are hoping to blot out sensation while other functions go on, I think there is reason to fear that a precision is required, which may not always be attained. Before the authorities in New York adopted electrocution as a means of killing murderers, experiments were carried out on animals larger than dogs (I do not know what animals were used) in an endeavour to fix a suitable voltage. The result was that a current of from 1,400 to 1,700 A.C. was adopted.

My reply to Dr. Wooldridge at the foot of this note covers the question of anaesthesia as far as my accident is concerned, and although the path was mainly through my arm and body to earth I was receiving 240 volts instead of 70, and the fact that I wanted to speak, and could not, shows that the current was cruising. This is not my first unpleasant experience with electricity. On one occasion I was shocked badly owing to a short in an all-metal electric lamp stand, and I do not desire a repetition of that knock. It is questionable if the slaughterman to whom Mr. Tweed refers would voluntarily give a demonstration of the contact he made with the hanging live wires, as a safe and painless means of assuming the recumbent position, and I wonder how many of the electrical anaesthesia enthusiasts would select this method for themselves for the purpose of a minor operation, apart altogether from the fact that the damage caused by electrical current does not always show itself immediately.

It would appear that the cause of death is not always the same when brought about by electricity, and the *post-mortem* findings vary. Our "powers of observation" and a study of the "theories as to the effects produced in electrical stunning" may not necessarily lead us to a correct conclusion. Nevertheless, I am not bold enough to say that Mr. Tweed is wrong, but I should be happy if I could feel as certain as he is. It may be, as he says, that my observations are unfortunate in view of the general use of the electric current for stunning purposes, but it is much more unfortunate if a large number of animals are not properly anaesthetised.

I shall be grateful if Mr. Tweed will publish or send me the references to which he alludes.

In reply to Dr. Wooldridge: I experienced no pain in connection with the burn or the fall on to the concrete at the time. The anxiety to let go the hair drier was acute, but the torture to which reference was made is a little difficult to describe. There was a weird general sensation of trembling, plus severe pain from muscular spasm all over the body. It can be slightly imitated locally by closing one's hand, flexing the elbow until the biceps is raised, and by then attempting to contract the biceps beyond its point of maximum contraction.

The fact that I felt neither the burn nor the fall, and that I could give no indication of consciousness, causes me to wonder whether animals immobilised by electricity fail to feel their throats cut, but experience nevertheless a sensation of terrible muscular contraction.

Yours faithfully

Penzance. S. J. Motton.
November 15th, 1936.